

Message Text

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ACTION OES-07

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FM AMEMBASSY OTTAWA

TO SECSTATE WASHDC 7589

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E.O. 11652: N/A

TAGS: ENRG, TECH, PARM

SUBJECT: SUPPLIERS OF CANDU COMPONENTS

DEPARTMENT FOR OES/NET - DIXON HOYLE

DEPARTMENT PLEASE PASS DOE/DP - IRVIN WILLIAMS

1. PURSUANT TO RECENT CONVERSATIONS WITH HOYLE OF DEPARTMENT AND WILLIAMS OF DOE, SCICOUNS MET WITH GORDON LEAIST OF AECL, TO DISCUSS POSSIBLE SUPPLIERS OF CANDU COMPONENTS IF REACTOR SOLD TO ROMANIA.

2. LEAIST SAID SPECIFIC SUPPLIERS HAVE NOT BEEN SELECTED BUT SAID HE COULD FURNISH LIST OF CANDIDATE SUPPLIERS WHICH IS THE SAME LIST AS DISCUSSED WITH WILLIAMS IN MONTREAL IN JANUARY 1977.

3. THE FOLLOWING LIST OF REACTOR SYSTEM COMPONENTS SUPPLIERS IS FROM LEAIST'S NOTES OF JANUARY 1977 MEETING:

(1) REACTOR

(1.1) NUCLEAR FUEL - CGE AND CW ARE CURRENTLY MANUFACTUR-
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ING NUCLEAR FUEL AND COMBUSTION IS A POTENTIAL NEAR TERM SUPPLIER. ALL THREE COMPANIES HAVE U.S. OWNERSHIP OF 75 PERCENT OR MORE. CANDU FUEL IS A CANADIAN DEVELOPMENT.

(1.2) PRESSURE TUBES - CHASE HAS SUPPLIED THE CANADIAN PROGRAM SINCE 1963. TUBES ARE DRAWN FROM ZR SPONGE OF

WHICH WAH CHANG (U.S.) IS VIRTUALLY A MONOPOLY SUPPLIER. HARVEY ALUMINIUM AT ONE TIME SUPPLIED PRESSURE TUBES IN THE U.S. BUT IT WITHDREW FROM THE MARKET. THE CHASE FACILITY IN ARNPRIOR WAS FINANCED IN CANADA. THE MATERIAL CURRENTLY USED, ZR-2 1/2 PERCENT NB, IS ESSENTIALLY EXCLUSIVE TO THE CANADIAN PROGRAM AND ORIGINATED FROM SOVIET INVESTIGATIONS.

(1.3) END FITTINGS - THESE WERE DEVELOPED IN CANADA AND ARE SUPPLIED BY DONLEE (TORONTO) AND CANADA FORGE. ROLLED JOINTS (END FITTING/PRESSURE TUBE) WERE DEVELOPED IN CANADA; BRAZING HAS BEEN EXPLORED BUT NOT USED.

(1.4) CALANDRIAS - ARE LOW PRESSURE STAINLESS STEEL TANKS MANUFACTURED BY DOMINION BRIDGE, A CANADIAN COMPANY, AND CANADIAN VICKERS, A UK OWNED COMPANY. THE MAJOR DIFFICULTY IN THEIR MANUFACTURE IS FITTING UP TO HIGH TOLERANCES.

(2) PHT SYSTEM.

(2.1) PIPING (FEEDER) - IS CARBON STEEL SUPPLIED FROM JAPAN.

(2.2) GRAYLOC FITTINGS - (END FITTING/FEEDER PIPES) ARE SUPPLIED BY A U.S. COMPANY BUT HAVE BEEN MODIFIED FOR USE IN CANDU REACTORS.
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(2.3) HEADERS - THE CYLINDERS FOR THESE HEADERS ARE CURRENTLY SUPPLIED FROM JAPAN (MITSUI) AND THE U.S. (U.S. STEEL AND CURTISS). TAYLOR FORGE (H.O. IN KANSAS AND A CANADIAN MANUFACTURING PLANT IN HAMILTON, ONTARIO) SUPPLY THE HEADERS TO THE CANADIAN PROGRAM AND ARE ESSENTIALLY MONOPOLY SUPPLIERS. THEY ARE AGGRESSIVE IN MAINTAINING THEIR HOLD ON MANUFACTURING TECHNOLOGY AND WILL NOT EXPORT IT.

(2.4) STEAM GENERATORS - CURRENT SUPPLIERS ARE B&W AND FOSTER WHEELER. COMBUSTION ENGINEERING IS A POTENTIAL FUTURE SUPPLIER. THE BASIC DESIGN OF THE STEAM GENERATORS IS SIMILAR TO THAT USED BY WESTINGHOUSE IN PRW'S. THERE ARE, HOWEVER, SUBSTANTIAL DIFFERENCES IN MATERIAL AND MANUFACTURE. FORGINGS FOR THE BOTTOM TUBE SHEET ARE SOURCED IN THE U.K. AND JAPAN. THESE FORGINGS ARE OVERLAYED (AN EXPENSIVE AND CRITICAL PROCESS) WITH AN ALLOY USING EQUIPMENT DEVELOPED IN CANADA AND THEN ARE DRILLED (LAHR DRILL). TUBE MATERIAL, INCOLOY 800, IS CURRENTLY USED IN THE CANADIAN PROGRAM AND IS NOT IN USE IN U.S. REACTOR PLANTS. THE TUBE/TUBE SHEET WELD IS

A CANADIAN DEVELOPMENT. THE INTEGRAL STEAM SEPARATOR DESIGN IS PECULIAR TO THE STEAM GENERATOR SUPPLIER. THE B&W SEPARATOR DESIGN CAN BE TRACED TO EARLY WORK FOR THE U.S. NAVY AND SUBSEQUENT DEVELOPMENT AT B&W'S BARBERTON, OHIO PLANT. PEEFLESS SUPPLIES STEAM SEPARATORS BUT SINCE THEY WILL NOT SUPPLY TEST DATA, AECL WILL NOT USE THEIR SEPARATORS. THE VESSEL WELDING INVOLVED IN THE MANUFACTURE OF STEAM GENERATORS WAS LARGELY DEVELOPED BY B&W IN CANADA.

(2.5) PUMPS - THE TWO CANADIAN SUPPLIERS OF PHT PUMPS ARE BYRON JACKSON AND BINGHAM-WILLAMETTE. PUMP SEALS ARE ESSENTIALLY THE ONLY ITEM SUPPLIED FROM THE U.S. AND EACH SUPPLIER HAS ITS OWN DESIGN. AECL HAS ALSO DEVELOPED LIMITED OFFICIAL USE

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A PUMP SEAL WHICH IS IN USE AT BRUCE. THE MANUFACTURING RIGHTS TO THESE SEALS HAVE BEEN SOLD TO THE PUMP SUPPLIERS EACH OF WHOM WOULD PREFER TO SELL ITS OWN SEAL BUT WOULD BE PREPARED TO USE THE AECL DESIGN. KSB (FRG) IS A TECHNICALLY INDEPENDENT SUPPLIER OF THESE PUMPS.

(2.6) PUMP MOTORS - CGE IS THE ONLY VENDOR. THE MOTORS ARE OF CANADIAN ORIGIN WITH THE ONLY U.S. INPUT BEING

INSULATION INFORMATION. G.E. (U.S.) DO NOT MANUFACTURE MOTORS LIKE THIS IN THE U.S. WHEREAS THE PRESSURE VESSEL DESIGN OF PWR'S REQUIRES THE SERVICE OF HIGH VOLUME/LOW HEAD PUMPS, THE CANDU PRESSURE TUBE REACTOR REQUIRES RELATIVELY LOW VOLUME/HIGH HEAD PUMPS.

(2.7) CASTING AND WELDING TECHNOLOGY - IS GENERALLY IN THE COMMON DOMAIN.

(3) VALVES

TWO FIRMS SUPPLY VALVES; VELAN (CANADIAN ORIGIN AND OWNERSHIP) AND HOPKINSON (U.K.).

(4) INSTRUMENTATION AND CONTROL
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COMPUTER CONTROL WAS FIRST APPLIED IN CANADA (DOUGLAS POINT). CURRENTLY VARIAN AND IBM SUPPLY THE BASIC COMPUTER COMPONENTS (MEMORY AND PROGRAMMABLE LOGIC FUNCTION) WHICH ARE ASSEMBLED BY CAE (MONTREAL). AECL WRITES THE PROGRAMS AND FINISHES THE DEVELOPMENT OF THE COMPUTERS AT THE SHERIDAN PARK ENGINEERING LABORATORY. COMPUTER MEMORY HARDWARE IS AVAILABLE FROM ABOUT TWENTY DIFFERENT SUPPLIERS AND THE SOFTWARE IS SUPPLIED BY AECL.

INSTRUMENTATION IS ESSENTIALLY THAT IN USE IN OIL REFINERIES.

(5) FUEL HANDLING SYSTEM

THE TECHNOLOGY WAS DEVELOPED IN CANADA. FUELLING MACHINES ARE CURRENTLY DESIGNED BY CGE UNDER AN AECL SUBCONTRACT. BOTH CGE AND STANDARD MODERN TOOL (U.K. OWNED) SUPPLY FUELLING MACHINES TO THE CANADIAN PROGRAM.

(6) IN-CORE FLUX DETECTORS

THESE ARE A CANADIAN DEVELOPMENT.

(7) ION EXCHANGE SYSTEMS

TWO SYSTEMS ARE IN USE, ONE EACH IN THE PHT AND MODERATOR COOLANT SYSTEMS. THE COLUMNS FOR THE HIGH PRESSURE PHT SYSTEM ARE SUPPLIED BY B&W AND THOSE FOR THE LOW PRESSURE MODERATOR SYSTEM BY A QUEBEC FIRM. JOHNSTON (U.S.) SUPPLIED THE SCREENS.

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IN 1957/58 THE U.S. NAVY UNDERTOOK WATER CHEMISTRY INVESTIGATIONS AT CRNL BUT WORK SINCE THEN IN THE U.S. AND CANADA HAS DIVERGED AND CANADA IS NOW IN FACT A SOURCE OF HELP TO THE U.S. PROGRAM. THE USE OF DIFFERENT MATERIALS IN THE PHT SYSTEMS OF U.S. AND CANADIAN REACTORS HAS GIVEN RISE TO SPECIFYING DIFFERENT WATER QUALITY REQUIREMENTS.

4. IF ADDITIONAL INFORMATION REQUIRED PLEASE ADVISE.
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